APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/676,422	09/29/2000	Douglas N. Kimelman	YOR920000293US1	5708

33233	7590	08/22/2005

LAW OFFICE OF CHARLES W. PETERSON, JR.
11703 BOWMAN GREEN DRIVE
SUITE 100
RESTON, VA 20190

EXAMINER
ALI, SYED J

ART UNIT	PAPER NUMBER
2195	

DATE MAILED: 08/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>23 August 2004</u>.

2a) ☒ This action is **FINAL.**   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is

   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-28* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-3,8-14,21,22 and 26-28* is/are rejected.

7) ☒ Claim(s) *4-7,15-20 and 23-25* is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a) ☐ All   b) ☐ Some *   c) ☐ None of:

   1. ☐ Certified copies of the priority documents have been received.

   2. ☐ Certified copies of the priority documents have been received in Application No. _____.

   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage

      application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

S-0-0

DETAILED ACTION

1.   This office action is in response to the amendment filed August 23, 2004. Claims 1-28 are presented for examination.

2.   The text of those sections of Title 35, U.S. code not included in this office action can be found in a prior office action.

3.   The cross reference related to the application cited in the specification must be updated (i.e. update the relevant status, with PTO serial numbers or patent numbers where appropriate, on page 1, lines 5-13; page 13 lines 1-16). The entire specification should be so revised.

Claim Rejections - 35 USC § 103

4.   **Claims 1-3, 9-14, 21-22, and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt (USPN 6,629,123) in view of Ibe et al. (USPN 6,437,804) (hereinafter Ibe).**

5.   As per claim 1, Hunt teaches the invention substantially as claimed, including a task management method for determining optimal placement of task components, said method comprising:

      a)   generating a communication graph representative of a task (col. 23 lines 13-23);

      c)   determining a min cut for the communication graph (col. 24 lines 8-28); and

d)   placing task components responsive to said min cut determined for the

communication graph (col. 23 lines 13-23)..

6.   Ibe teaches the invention as claimed, including:

b)   identifying independent nets in said communication graph (col. 8 line 31 - col. 9

line 32).

7.   It would have been obvious to one of ordinary skill in the art to combine Hunt with Ibe

since the method of cutting a graph as depicted by Hunt suffers the drawback of being inflexible

in terms of the partitioning algorithm used.   Ibe provides multiple partitioning algorithms that

seek to produce independent graphs to reduce bottlenecks. Ibe introduces the concept of anchor

nodes that serve as a base node for a cluster, which allows the network to be partitioned to

eliminate weak links of communication, thereby improving the communication across clusters

(independent nets).   Although it is noted that Ibe is mostly described within a network

communication topology, the application is not limited to this.   Any system that can be

represented as a group of nodes and edges, including task components, e.g. Hunt, can make use

of the partitioning algorithm taught by Ibe (col. 5 lines 26-30).   Thus, the combination of

partitioning performed by Hunt and Ibe would allow task components to be optimally distributed

across various system components, while eliminating communication (or inter-process

communication) bottlenecks, such that overall system performance is greatly improved.

8.   As per claim 2, Hunt teaches the invention as claimed, including a task management

method as in claim 1, wherein the communication graph generated in step (a) comprises:

task components represented as nodes of said communication graph (col. 24 lines 8-28);

and

edges connecting ones of said nodes representing communication between connected

nodes (col. 24 lines 8-28).

9.   As per claim 3, Hunt teaches the invention as claimed, including a task management

method as in claim 2, after the step (a) of generating a communication graph, further comprising

the steps of:

      a1)   weighting edges, said edges being weighted proportional to communication

between connected nodes (col. 24 lines 8-28); and

      a2)   assigning terminal nodes, task components being placed on said terminal nodes in

the task placing step (d) (col. 24 lines 8-28).

10.   As per claim 9, Hunt teaches the invention as claimed, including a task management

method as in claim 3, wherein each said task component is a unit of the computer program (col.

24 lines 8-28).

11.   As per claim 10, Hunt teaches the invention as claimed, including a task management

method as in claim 9, wherein said each computer program unit is an instance of an object in an

object-oriented program (col. 1 lines 36-55).

12.   As per claim 11, Hunt teaches the invention as claimed, including a task management

method as in claim 9, wherein in step (d) computer program units are placed on computers,

computer program units being placed on a common computer being combined into a single

component (col. 24 lines 42-48).

13.   As per claim 12, Hunt teaches the invention substantially as claimed, including a

distributed processing system for determining optimal placement of computer program

components on multiple computers, said distributed processing system comprising:

means for generating a communication graph representative of a computer program (col.

23 lines 13-23);

means for determining a min cut for the communication graph (col. 24 lines 8-28);

means for placing program components on ones of multiple independent computers

responsive to said min cut determined for the communication graph (col. 23 lines 13-23); and

said computer program being executed by said multiple independent computers (Figs 1-

2).

14.   Ibe teaches the invention as claimed, including means for identifying independent nets in

said communication graph (col. 8 line 31 - col. 9 line 32).

15.   As per claim 13, Hunt teaches the invention as claimed, including a distributed

processing system as in claim 12, wherein the communication graph comprises:

a plurality of nodes, each of said plurality of nodes representing one of said program

components (col. 24 lines 8-28); and

a plurality of edges connecting ones of said nodes, each of said edges representing communication between connected nodes (col. 24 lines 8-28).

16.   As per claim 14, Hunt teaches the invention as claimed, including a distributed processing system as in claim 13, further comprising:

weighting means for weighting said edges proportional to communication between connected said nodes (col. 24 lines 8-28).

17.   As per claims 21-22 and 27-28, Hunt teaches the invention substantially as claimed, including a computer program product for partitioning a graph, said computer program product comprising a computer usable medium having computer readable program code thereon, said computer readable program code implementing the method of claims 1-3 and 9-11, respectively (Fig. 2).

18.   **Claims 8 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt in view of Ibe in view of Padberg et al. ("An Efficient Algorithm for the Minimum Capacity Cut Problem") (hereinafter Padberg).**

19.   As per claim 8, Padberg teaches the invention as claimed, including a task management method as in claim 3, wherein the step (c) of determining a min cut comprises the steps of:

i)   listing all independent nets as subgraphs in a subgraph list (pg. 27-30, procedure SETUP);

ii)   selecting a subgraph from said subgraph list (pg. 27-30, procedure TEST1);

iii)   applying a linear complexity method to said subgraph, if said linear complexity method divides said subgraph into two or more smaller independent nets, listing said smaller independent nets in said subgraph list and returning to step (i) (pg. 27-30, procedure TEST1);

iv)   checking whether said subgraph includes two or more smaller independent nets, if said subgraph includes two or more smaller independent nets, identifying and listing said smaller independent nets in said subgraph list and returning to step (i) (pg. 27-30);

v)   applying a higher complexity method to said subgraph, said higher complexity method being more complex than said linear complexity method and, if said higher complexity method divides said subgraph into two or more smaller independent nets, listing said smaller independent nets in said subgraph list and returning to said step (i) (pg. 27-30, procedure TEST2);

vi)   selectively collapsing an edge to reduce said subgraph, if collapsing said edge divides said subgraph into two or more smaller independent nets, listing said smaller independent nets in said subgraph list and returning to step (i) (pg. 27-30); and

vii)   checking whether said subgraph list is empty (pg. 26).

20.   It would have been obvious to one of ordinary skill in the art to combine Hunt, Ibe, and Padberg since the procedure for determining a minimum cost cut of a graph is of great importance in terms of attempting to reduce communication time, particularly for network communication. However, many minimum cut procedures can be costly and difficult to implement, potentially negating the benefit gained from finding the minimum cut. Hunt and Ibe

both state that partitioning algorithms are particularly difficult to implement for larger graphs with a large number of nodes. The minimum cut procedure of Padberg provides an improvement upon previous minimum cut procedures in that it has the same worst case bound as previous methods, but it easier to implement and has been shown to be more efficient than previous methods, especially in cases of graphs with a large number of nodes (see pages 31-35 for computational results).

21.   As per claim 26, Hunt teaches the invention as claimed, including a computer program product for partitioning a graph, said computer program product comprising a computer usable medium having computer readable program code thereon, said computer readable program code implementing the method of claim 8 (Fig. 2).

Response to Arguments

22.   **Applicant's arguments filed August 23, 2004 have been fully considered but they are not persuasive.**

23.   Applicant argues that Ibe is deficient for the teachings of claim 1 because the anchor nodes of Ibe are distinguishable from the claimed terminal nodes. To support this contention, Applicant adds that the clusters formed in Ibe do not necessarily correspond to independent nets described in the application. Applicant also attacks the motivation to combine the references.

24.   First, it should be noted that the limitations pertaining to "terminal nodes" are not present in claim 1. The initial recitation of this limitation is in claim 3. Nonetheless, Examiner

respectfully disagrees that the anchor nodes of Ibe are not analogous to the claimed terminal nodes. In the claimed invention, a graph is partitioned into sub-graphs by assigning terminal nodes, with one terminal node belonging in each independent net. Similarly, Ibe restricts each cluster to having one anchor node. The claimed invention seeks to divide the graph into sets of components that do not communicate with other sets of components, whereas Ibe seeks to create efficient partitions by eliminating weak edges of communication. While eliminating "weak edges" may not be expressly equivalent to dividing the graph into components that do not communicate at all, the same objective is sought, i.e. to create sub-graphs that communicate often and would benefit from being clustered or grouped together.

It is noted that the independent nets of the claimed invention differ in many ways from those shown by Ibe, most notably in that Ibe allows a node to belong to multiple clusters, whereas the claimed invention requires each node to belong to only one independent net. However, these requirements are not evident from the independent claims; the features describing how an independent net is formed and what is contained therein is discussed beginning in claim 4.

25.   In response to Applicant's contention the motivation to combine Hunt and Ibe is based on improper hindsight, Examiner respectfully disagrees. It must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Allowable Subject Matter

26.   **Claims 4-7, 15-20, and 23-25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.**

Conclusion

27.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J. Ali whose telephone number is (571) 272-3769. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T. An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Syed Ali
August 16, 2005

MENG-AI T. AN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100